

# FCC Test Report for Parts 15.247, 15.209 (DSS)

Product name : Communication Hub  
Applicant : Neways Electronics International NV  
FCC ID : 2AK2ZHUB1

Test report No. : 161000613 03 Ver2.00

## Laboratory information

### Accreditation

Telefication is designated by the FCC as an Accredited Test Firm for compliance testing of equipment subject to Certification under Parts 15 & 18. The Designation number is: NL0001

The Industry Canada registration number for the 3 meter test chamber of Telefication is: 4173A-1.

### Documentation

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2005. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 10 years at Telefication Netherlands

### Testing Location

Test Site	Telefication BV
Test Site location	Edisonstraat 12a 6902 PK Zevenaar The Netherlands  Tel. +31316583180 Fax. +31316583189
Test Site FCC	NL0001

## Revision History

Version	Date	Remarks	By
v0.50	22-11-2016	First draft	RvB
v1.00	02-02-2017	Release version	RvB
v2.00	23-02-2017	In section 1.3 changed FCC ID and product name	RvB

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## Summary of Test results

FCC	Description	Section in report	Verdict
15.247(a)(1)	Number of hopping channels	3.1	Pass
15.247(a)(1)	Hopping channels separation	3.2	Pass
15.247(a)(1)	Dwell time	3.3	Pass
15.247(a)(1)	99% and 20 dB Bandwidth	3.4	Pass
15.247(b)(1)	RF output power	3.5	Pass
15.247(d)	Radiated Band edges	3.6	Pass
15.209 (a)	Radiated Spurious emissions	3.7	Pass
15.205 (a)	Spurious emissions in the restricted bands	3.7	Pass

## 1 General Description

### 1.1 Applicant

Client name:	Neways Electronics International NV
Address	Science Park Eindhoven 5010
Zip code:	5692 EA
E-mail:	<a href="mailto:Tim.van.der.Loo@newayselectronics.com">Tim.van.der.Loo@newayselectronics.com</a>
Contact name:	T. van der Loo

### 1.2 Manufacturer

Manufacturer name:	SC Industries
Address:	24151 Telegraph Road, Suite 100, Southfield, USA
E-mail:	<a href="mailto:sd@lifeear.com">sd@lifeear.com</a>
Contact name:	Sreenivas Cherukuri

### 1.3 Tested Equipment Under Test (EUT)

Product name:	Communication Hub
Brand name:	LifeEar
Product type:	Communication Hub between hearing aid and Smartphone
FCC ID:	2AK2ZHUB1
Model(s):	HUB-1
Software version:	V1.0
Hardware version:	V4
Date of receipt	04-11-2016
Tests started:	04-11-2016
Testing ended:	22-11-2016

## 1.4 Product specifications of Equipment under test

Tx Frequency range (MHz):	Bluetooth BR/EDR/LE: 2402 - 2480 NFMI: 10.579
Rx frequency range (MHz):	Bluetooth BR/EDR/LE: 2402 - 2480 NFMI: 10.579
Maximum output power to antenna:	Bluetooth BR/EDR/LE: -- NFMI: 7.37 mV
Antenna type :	Bluetooth BR/EDR/LE: Ceramic antenna NFMI: Loop antenna
Antenna gain(dBi):	Bluetooth BR/EDR/LE: 0 dBi NFMI:--
Type of modulation:	Bluetooth BR/EDR: GFSK, $\pi/4$ -DQPSK, 8-DPSK Bluetooth LE: GFSK NFMI:CP-FSK
Channel Spacing (MHz):	Bluetooth BR/EDR:1 Bluetooth LE: 2
Emission designator Bluetooth BR :	998KG1D
Emission designator Bluetooth EDR:	1M12G1D
Emission designator Bluetooth BLE:	700KG1D
Emission designator NFMI:	570KX1X

## 1.5 Modification of the Equipment Under Test (EUT)

None.

## 1.6 Observations and remarks

The EUT Contains 2 radios, 1 Bluetooth radio with FCC ID: SSSBC127-X and a NFMI radio operating at 10.579 MHz. During testing both radios were active.

The EUT has a USB port which is used for charging the lithium-ion battery, the data lines are not connected.

The Bluetooth Low Energy test results can be found in test report 161000613 05.

## 1.7 Environmental conditions

Test date	04-11-2016	21-11-2016	22-11-016
Ambient temperature	23.8°C	26.7°C	22.7°C
Humidity	43.5%	48.1%	38.3%

## 1.8 Measurement Standards

- FCC Public Notice DA 00-705
- ANSI C63.10:2013

## 1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247, §15.209



## 1.10 Conclusions

The sample of the product showed NO NON-COMPLIANCES to the specifications stated in paragraph 1.9 of this report.

The results of the test as stated in this report, are exclusively applicable to the product items as identified in this report. Telefication accepts no responsibility for any properties of product items in this test report, which are not supported by the tests as specified in paragraph 1.9 *"Applicable standards"*.

All tests are performed by:

Name : ing R. van Barneveld

Review of test methods and report by:

Name : ing P.A. Suringa

The above conclusions have been verified by the following signatory:

Date : 02-03-2017

Name : ing K.A. Roes

Function : Coordinator Radio laboratory

Signature : 

## 2 Test configuration of the Equipment Under Test

### 2.1 Test mode

The applicant provided test mode firmware for the EUT, in which it was possible to configure the EUT into different test channels.

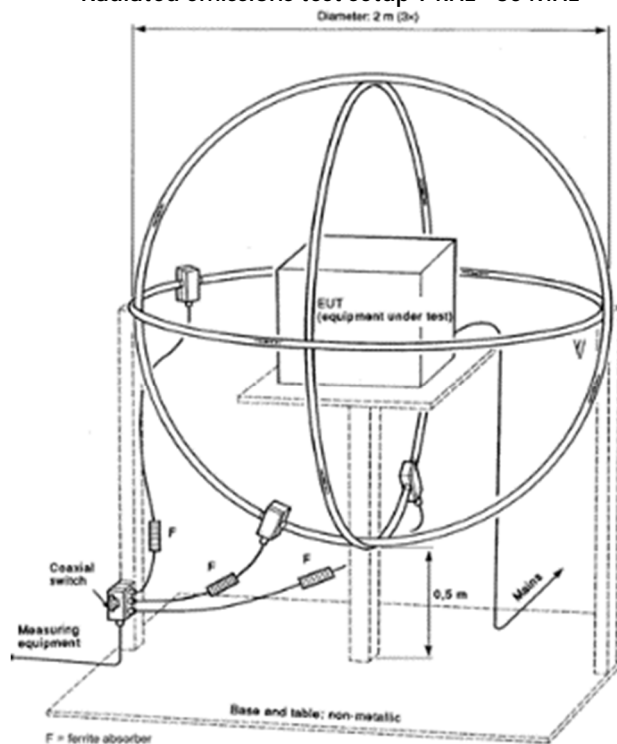
The USB data line were connected, to program the different setting in the EUT.

### 2.2 Tested channels and Data rates

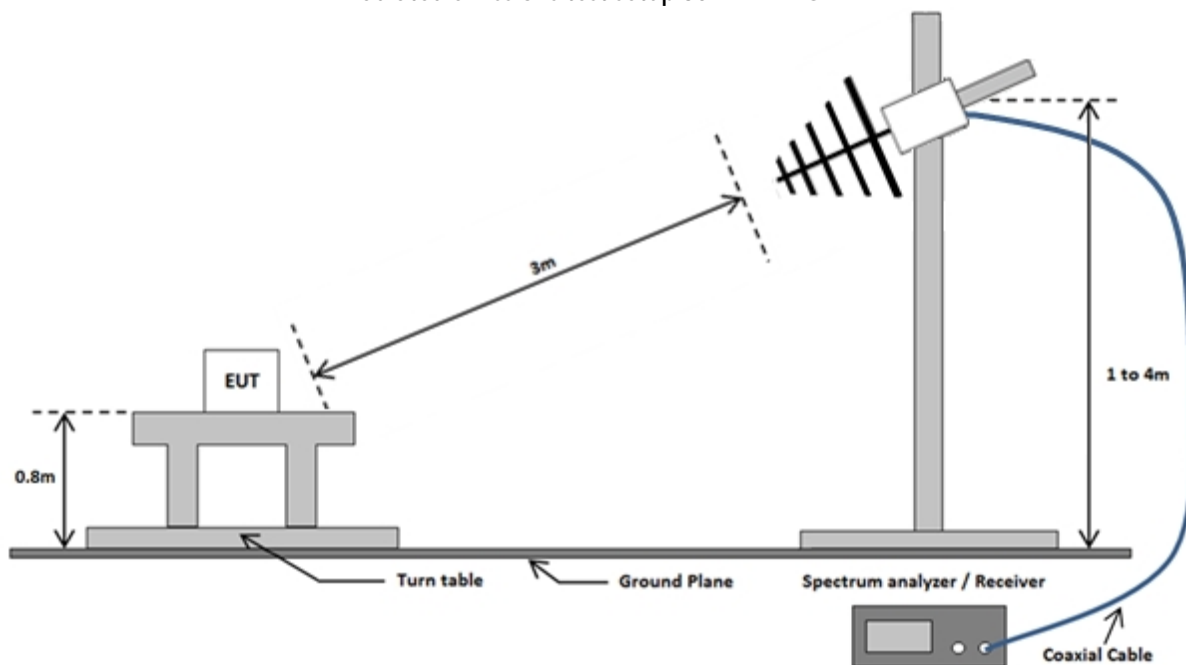
Technology	Channels	Packet type	Data rate	Frequency (MHz)
Bluetooth BR	0	DH5	1 Mbps	2402
	39	DH5	1 Mbps	2441
	78	DH5	1 Mbps	2480
Bluetooth EDR	0	3-DH5	1 Mbps	2402
	39	3-DH5	1 Mbps	2441
	78	3-DH5	1 Mbps	2480
NFMI	--	--	259 kB/s	10.579

## 2.3 Radiated Test setup

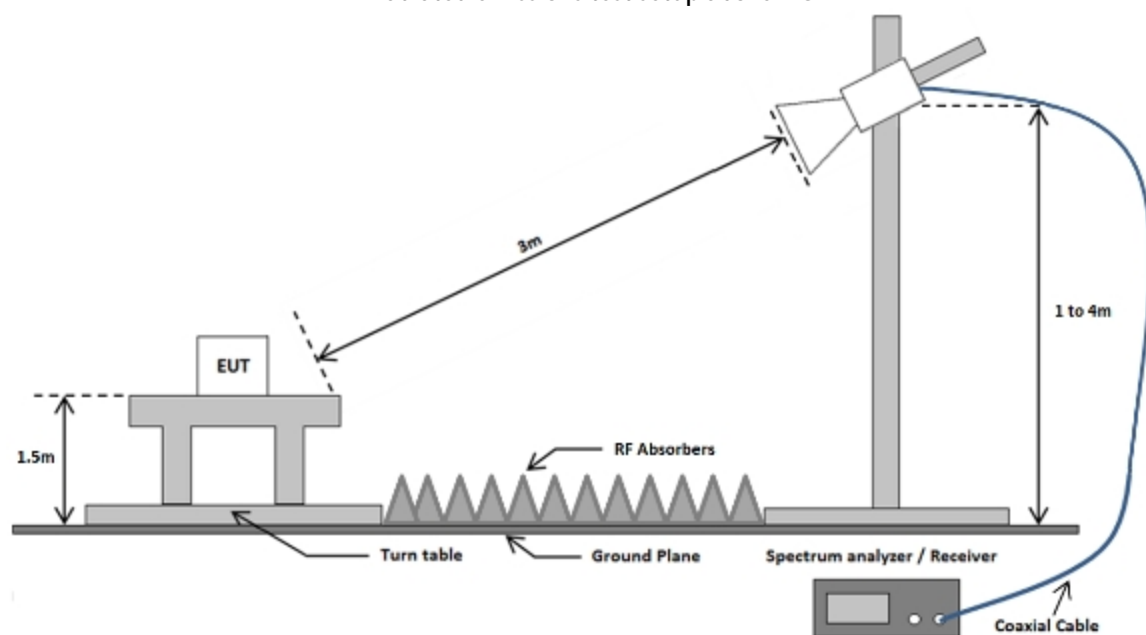
Radiated emissions test setup 9 kHz - 30 MHz



Radiated emissions test setup 30 MHz - 1 GHz



### Radiated emissions test setup above 1 GHz



## 2.4 Equipment used in the test configuration

Description	Manufacturer	Model	ID	Used at Par.
Signal Generator	Hewlett Packard	83650B	TE00487	3.1 to 3.5
Spectrum Analyzer	Rohde & Schwarz	FSV	TE01269	3.1 to 3.5
Spectrum Analyzer	Rohde & Schwarz	FSP40	TE11125	3.6
Spectrum Analyzer	Rohde & Schwarz	ESR7	TE01220	3.6, 3.7
10 MHz distribution Amplifier	Stanford Research Systems	FS735/1	TE01278	3.1 to 3.5
USB to GPIB adapter	National Instruments	GPIB-USB-HS+	TE01283	3.1 to 3.5
Biconilog Antenna	Chase	CBL6112A	TE00967	3.6
Horn Antenna	EMCO The Electro – Mechanics Co	3115	TE00531	3.6
SAC Chamber	Comtest Engineering BV	-	TE00861	3.6
Artificial Mains Network (AMN)	Rohde & Schwarz	ESH3-Z5	TE00208	3.7
Pulse limiter	Rohde & Schwarz	ESH3-Z2	TE00756	3.7
High pass filter	Wainwright instruments	WHK3.0/18G-10EF	TE01140	3.6
Pre-amplifier	Miteq	JF4-18004000-30-8P-A1	TE11131	3.6

## 2.5 Sample calculations

Field Strength Calculation using example values:

Frequency (GHz)	Polarization	Height(m)	Peak (dB $\mu$ V/m)
4.959	Vertical	3	51.8

The following relation applies:

$$E \text{ (dB}\mu\text{V/m)} = U \text{ (dB}\mu\text{V)} + AF \text{ (dB/m)} - G \text{ (dB)} + CL \text{ (dB)}$$

Where:

E = Electric field strength

U = Measuring receiver voltage

AF = Antenna factor

G = Gain of the pre-amplifier

CL = Cable loss

$$(51.8 = 52.49 + 33.1 - 38.19 + 4.4)$$

### 3 Test results

#### 3.1 Number of Hopping Channels Measurement

##### 3.1.1 Limit

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 hopping channels.

##### 3.1.2 Measurement instruments

The measurement instruments are listed in chapter 2.5 of this report.

##### 3.1.3 Test setup

The test setup is as shown in chapter 2.3 of this report.

##### 3.1.4 Test procedure

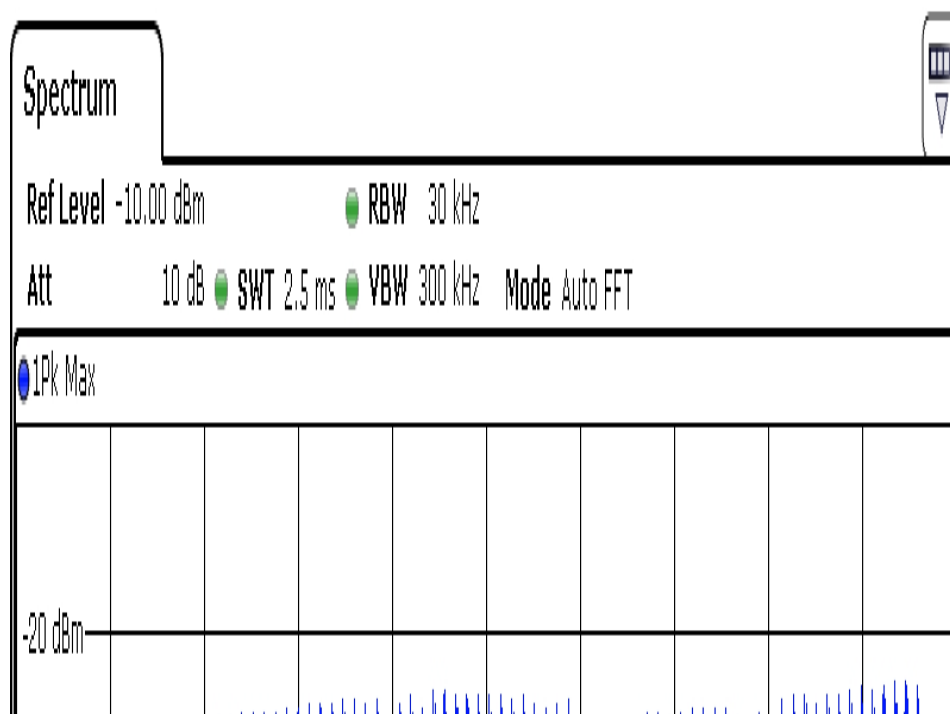
The testing follows FCC Public Notice DA 00-705.

##### 3.1.5 Test Results of the Number of Hopping Channels Measurement

Technology Std.	Packet type	Number of hopping channels	Limit
Bluetooth EDR	DH5	79	>15
Bluetooth AFH	3-DH5	20	>15

### 3.1.6 Plots of the Hopping Channel Separation Measurement

#### Bluetooth EDR



#### Bluetooth AFH



## 3.2 Hopping Channel Separation Measurement

### 3.2.1 Limit

Frequency hopping systems in the 2400 – 2483.5 MHz band shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

### 3.2.2 Measurement instruments

The measurement instruments are listed in chapter 2.5 of this report.

### 3.2.3 Test setup

The test setup is as shown in chapter 2.3 of this report.

### 3.2.4 Test procedure

The testing follows FCC Public Notice DA 00-705.

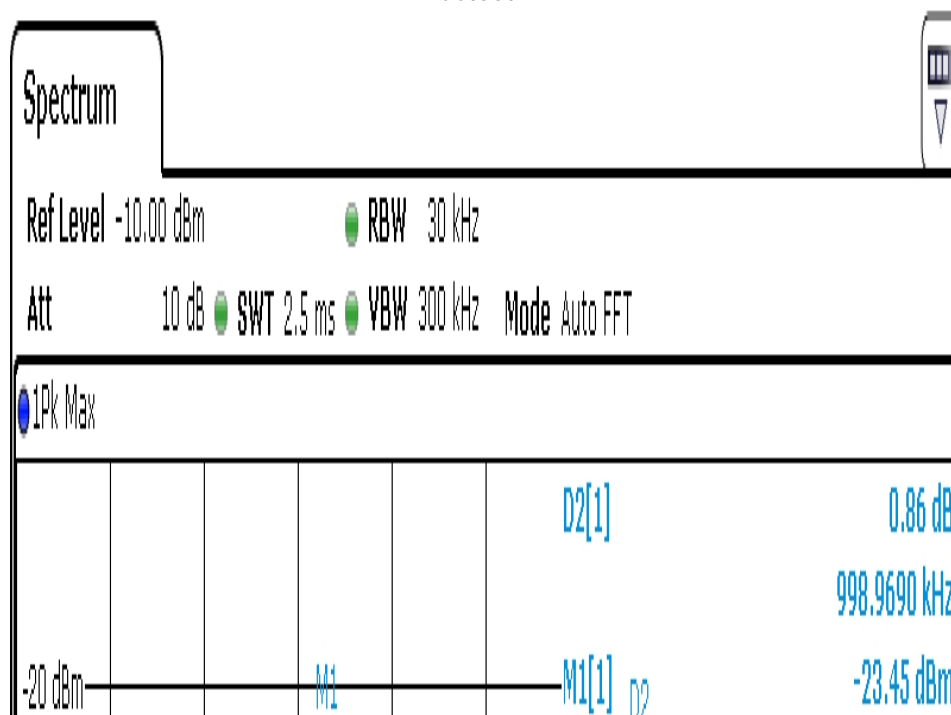
### 3.2.5 Test Results of the Hopping Channel Separation Measurement

Technology Std.	Channel	Frequency (MHz)	Packet type	Frequency Separation (kHz)	(2/3 of 20 dB BW) Limit (kHz)
Bluetooth BR	0/1	2402	DH5	998.97	431.29
Bluetooth EDR	0/1	2402	3-DH5	998.97	779.26
Uncertainty	$\pm 707\text{kHz}$				

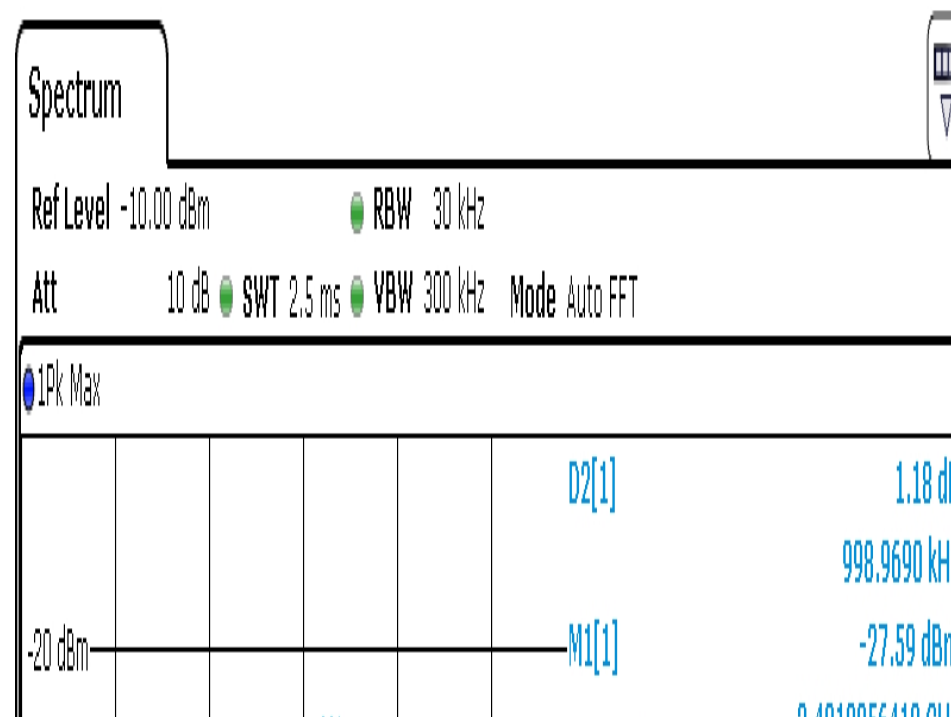


### 3.2.6 Plots of the Hopping Channel Separation Measurement

#### Bluetooth BR



#### Bluetooth EDR



### 3.3 Dwell Time Measurement

#### 3.3.1 Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period 0.4 x the number of hopping channels employed.

#### 3.3.2 Measurement instruments

The measurement instruments are listed in chapter 2.5 of this report.

#### 3.3.3 Test setup

The test setup is as shown in chapter 2.3 of this report.

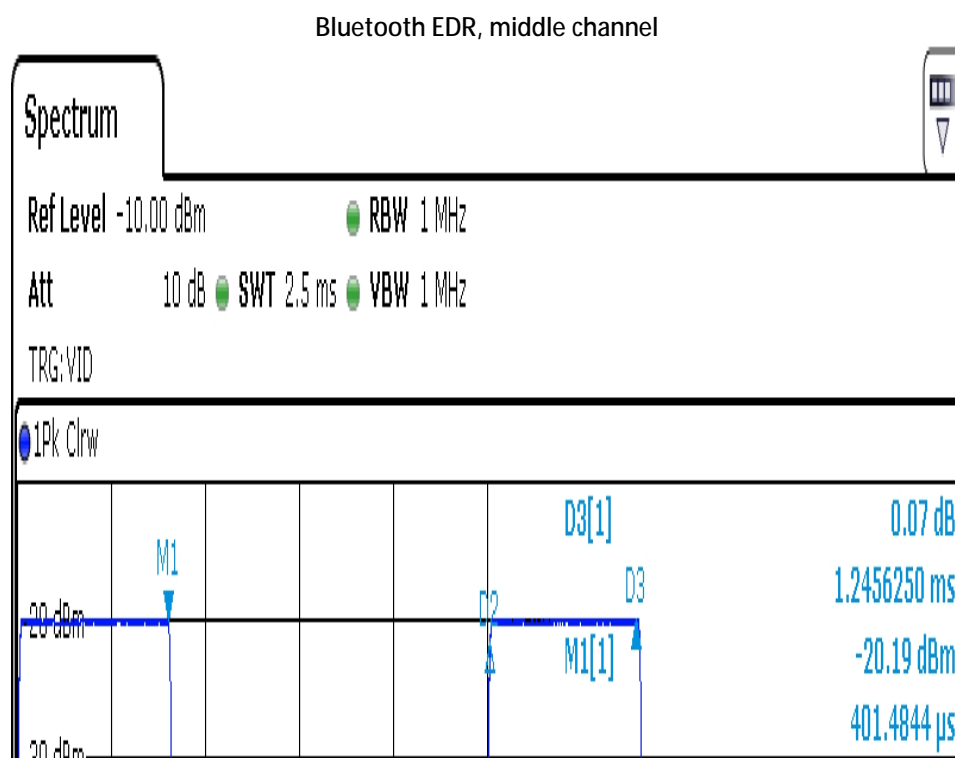
#### 3.3.4 Test procedure

The testing follows FCC Public Notice DA 00-705.

#### 3.3.5 Test Results of the Dwell time Measurement

Mode	Nr. Of hopping channels	Nr. Of hops during occupancy time	Packet transfer time (ms)	Dwell time (ms)	Limit (sec)
Bluetooth BR	79	640	0.401	128	0.4
Bluetooth AFH	20	320	0.401	64	0.4
Uncertainty	±2.85 %				

#### 3.3.6 Plot of the Dwell time Measurement



### 3.4 99% and 20 dB bandwidth Measurement

#### 3.4.1 Limit

Reporting only

#### 3.4.2 Measurement instruments

The measurement instruments are listed in chapter 2.5 of this report.

#### 3.4.3 Test setup

The test setup is as shown in chapter 2.3 of this report.

#### 3.4.4 Test procedure

The testing follows FCC Public Notice DA 00-705.

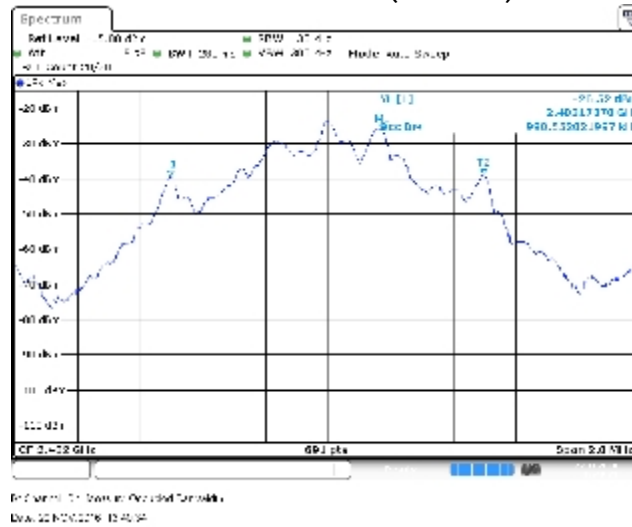
#### 3.4.5 Test Results of the 99% and 20 dB bandwidth Measurement

Technology Std.	Channel	Frequency (MHz)	Packet type	99%bandwidth (MHz)
Bluetooth BR	0	2402	DH5	0.998
	39	2441	DH5	0.992
	78	2480	DH5	0.995
Bluetooth EDR	0	2402	3-DH5	1.120
	39	2441	3-DH5	1.123
	78	2480	3-DH5	1.123
Uncertainty	$\pm 707$ kHz			

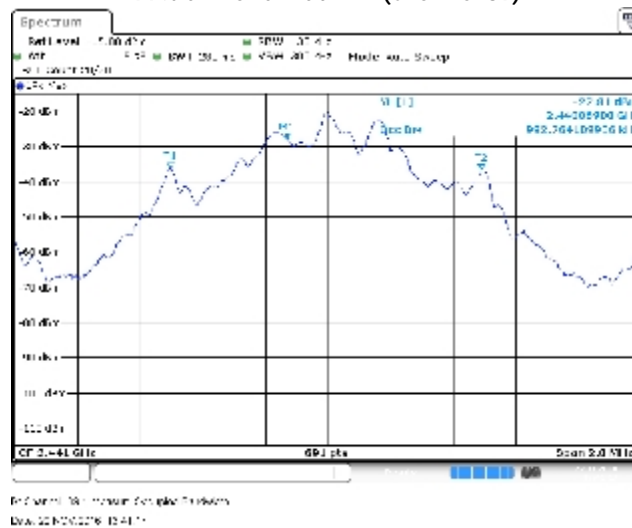
Technology Std.	Channel	Frequency (MHz)	Data rate	20 dB bandwidth (MHz)
Bluetooth BR	0	2402	DH5	0.647
	39	2441	DH5	0.646
	78	2480	DH5	0.647
Bluetooth EDR	0	2402	3-DH5	1.169
	39	2441	3-DH5	1.172
	78	2480	3-DH5	1.175
NFMI	--	10.579	9.6 kB/s	0.570
Uncertainty	$\pm 707$ kHz			

### 3.4.6 Plots of the 99% and 20 dB bandwidth Measurement

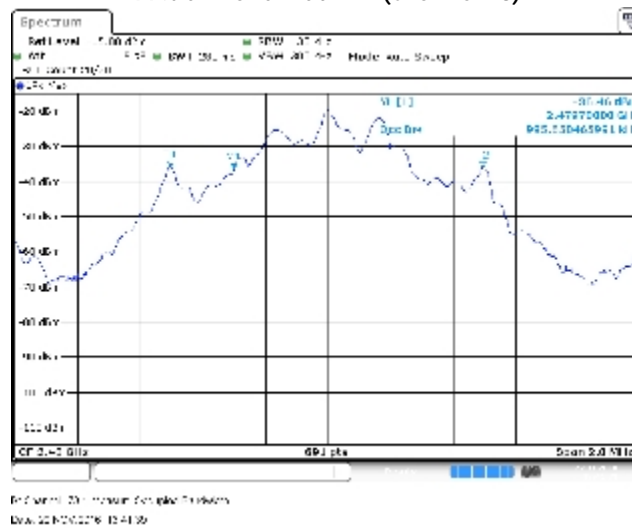
99% dB Bandwidth BR (Channel 0)



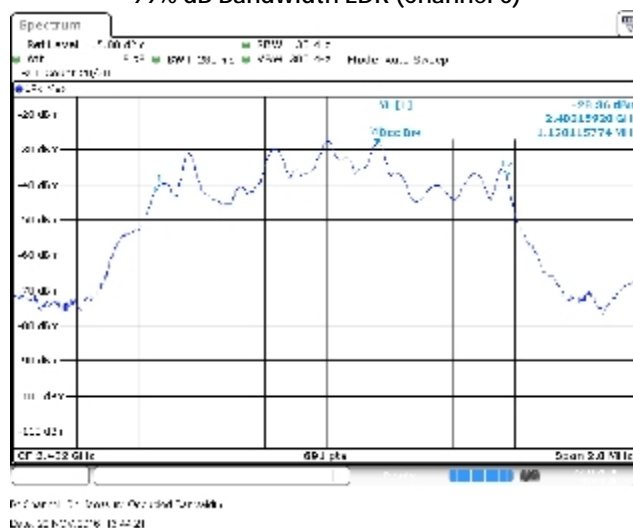
99% dB Bandwidth BR (Channel 39)



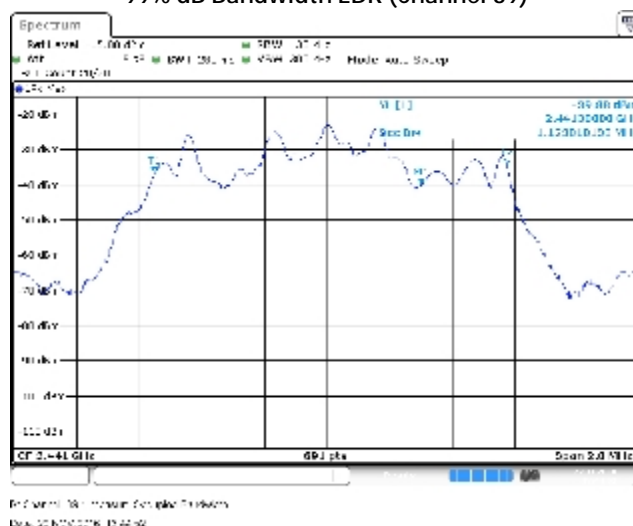
99% dB Bandwidth BR (Channel 78)



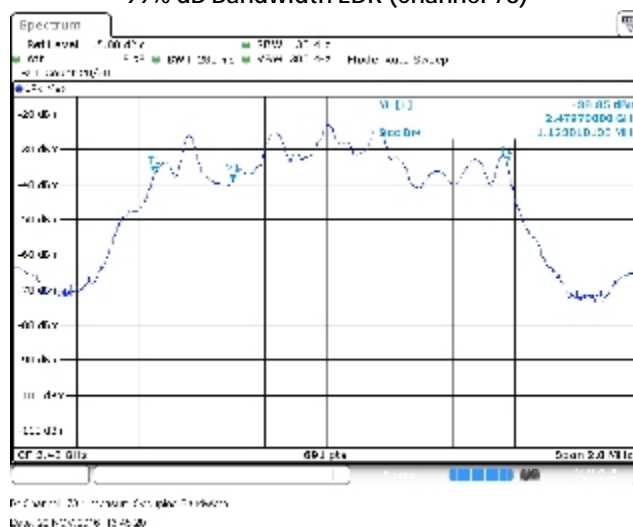
99% dB Bandwidth EDR (Channel 0)



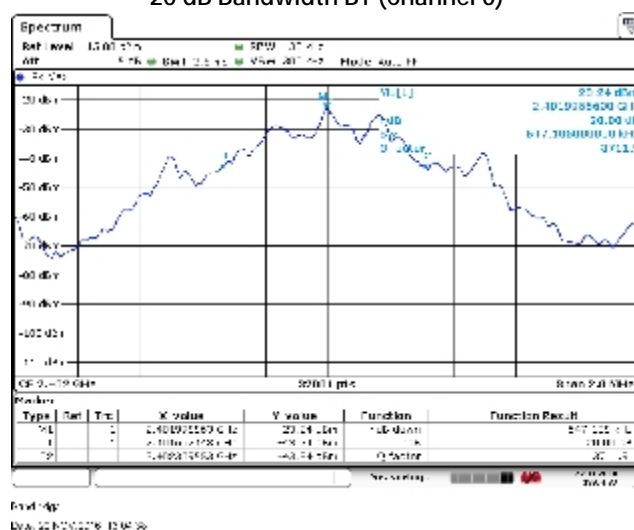
99% dB Bandwidth EDR (Channel 39)



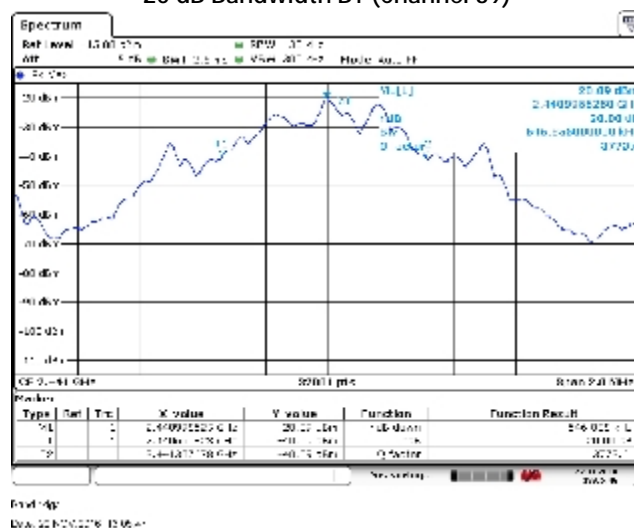
99% dB Bandwidth EDR (Channel 78)



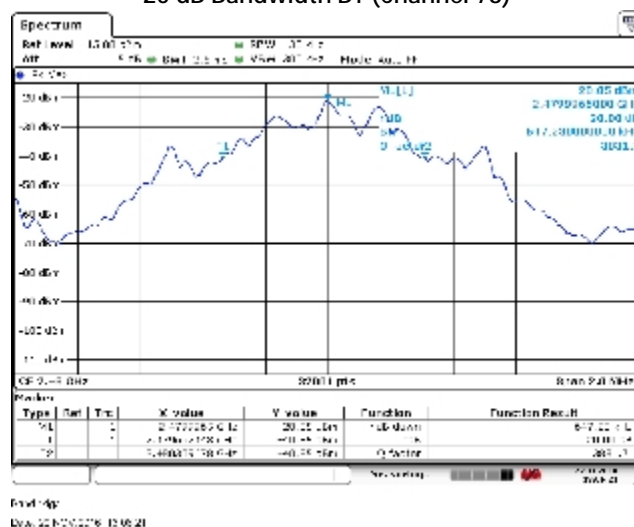
20 dB Bandwidth BT (Channel 0)



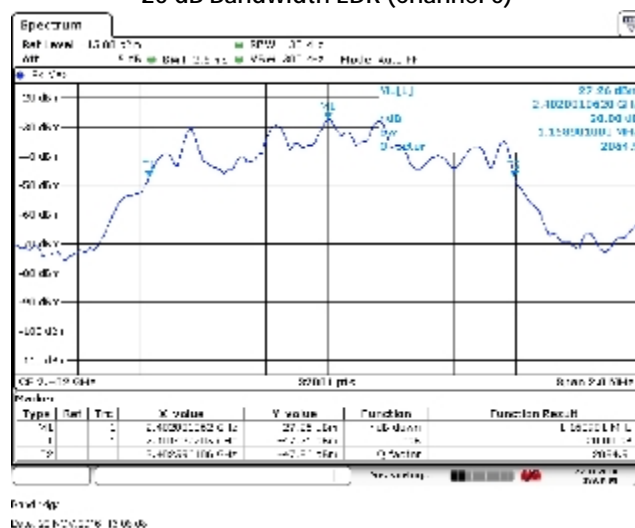
20 dB Bandwidth BT (Channel 39)



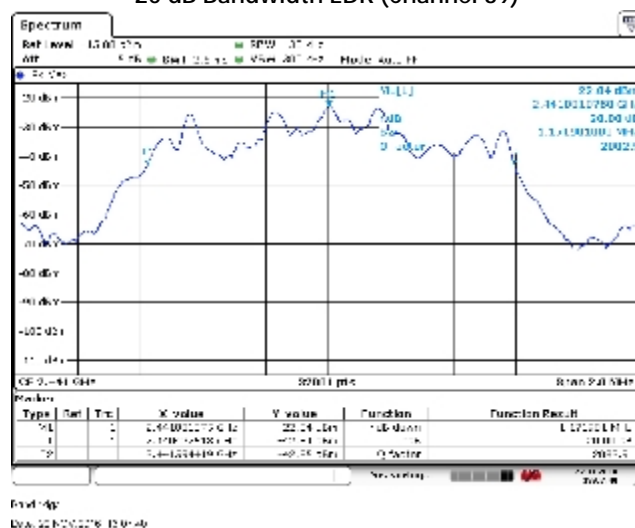
20 dB Bandwidth BT (Channel 78)



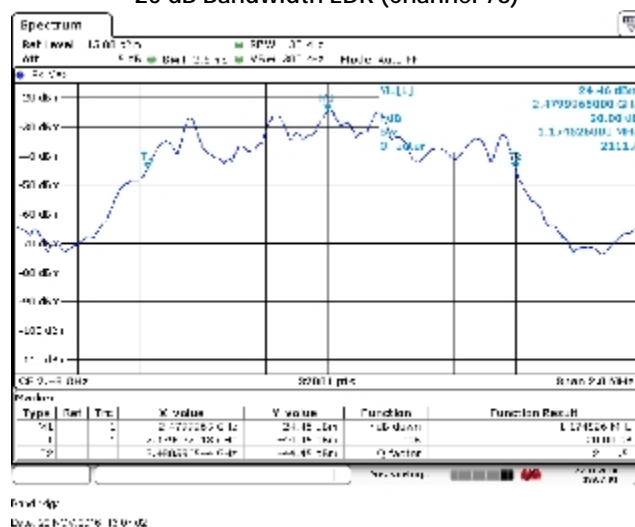
20 dB Bandwidth EDR (Channel 0)



20 dB Bandwidth EDR (Channel 39)



20 dB Bandwidth EDR (Channel 78)



### 3.5 Output Power Measurement

#### 3.5.1 Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. If transmitting antenna of directional gain greater than 6 dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point to point operation, the limit has to be reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### 3.5.2 Measurement instruments

The measurement instruments are listed in chapter 2.5 of this report.

#### 3.5.3 Test setup

The test setup is as shown in chapter 2.3 of this report.

#### 3.5.4 Test procedure

The testing follows FCC Public Notice DA 00-705.

#### 3.5.5 Test results of Output Power Measurement

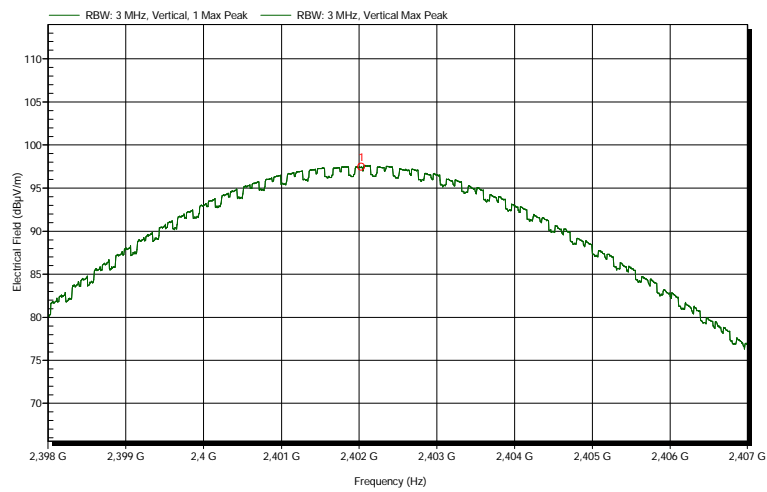
Technology Std.	Peak method			
	Channels	Frequency (MHz)	Packet type	Peak output power (dBm)
Bluetooth BR	0	2402	DH5	2.3
	39	2441	DH5	6.8
	78	2480	DH5	7.5
Bluetooth EDR	0	2402	3-DH5	1.5
	39	2441	3-DH5	7.2
	78	2480	3-DH5	6.5
Uncertainty	$\pm 1.78$ dB			

Note : The peak output power was measured radiated

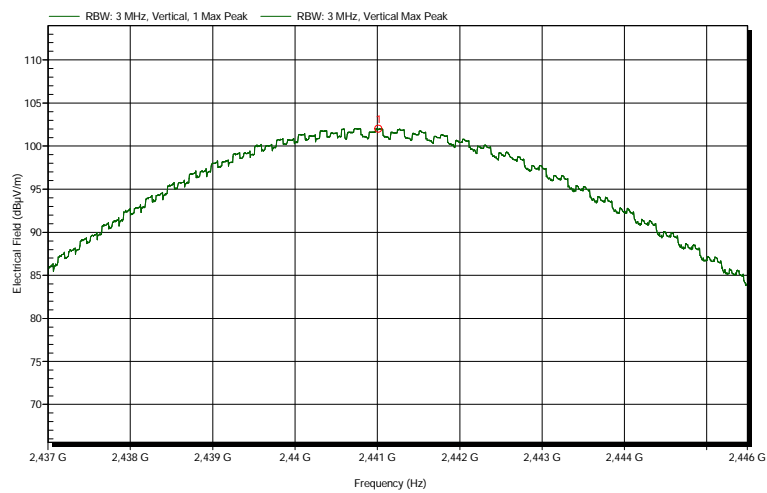


### 3.5.6 Plots of Peak Output Power Measurement

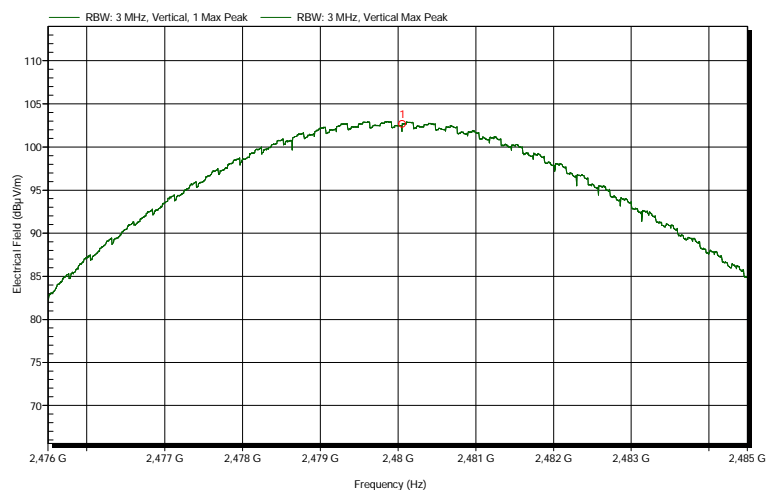
Peak Output Power, Bluetooth BR (Channel 0)



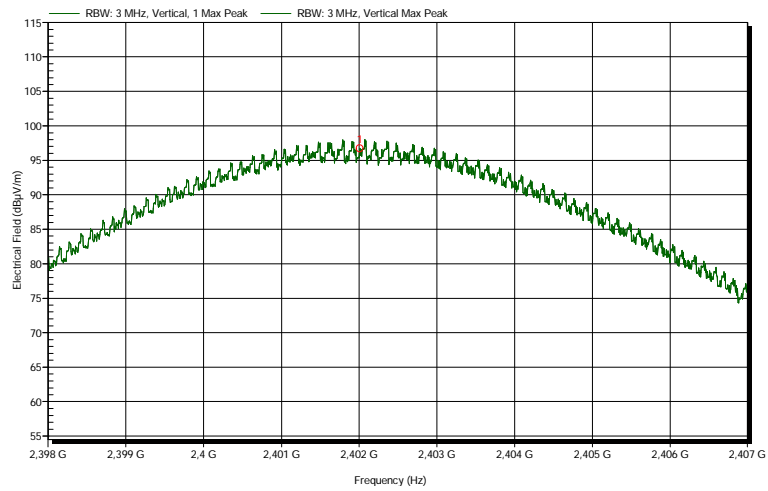
Peak Output Power, Bluetooth BR (Channel 39)



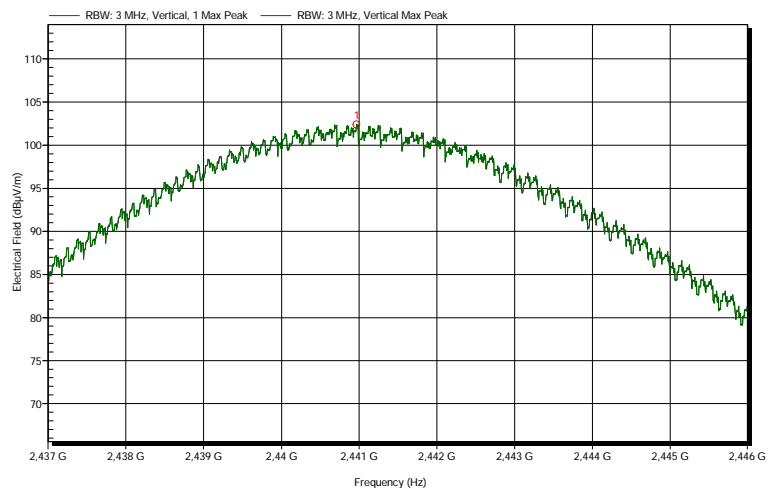
Peak Output Power, Bluetooth BR (Channel 78)



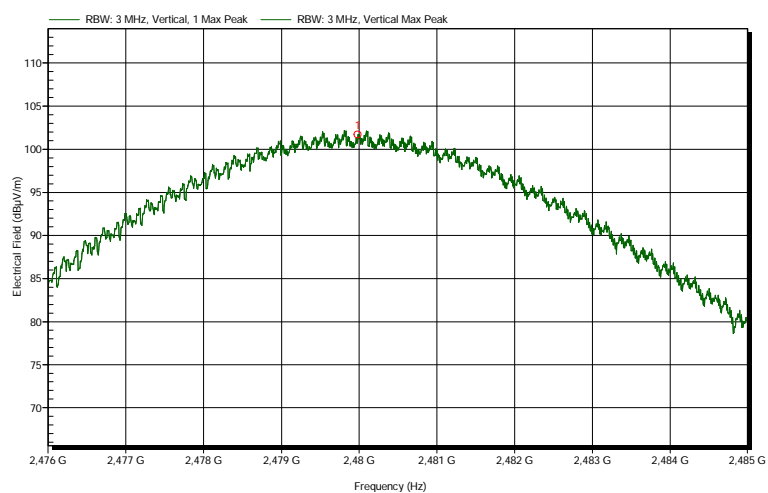
### Peak Output Power, Bluetooth EDR (Channel 0)



### Peak Output Power, Bluetooth EDR (Channel 39)



### Peak Output Power, Bluetooth EDR (Channel 78)



### 3.6 Radiated Spurious Emissions Measurement

#### 3.6.1 Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

15.209

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	Measurement distance(m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 -88	100	3
88 - 216	150	3
216-960	200	3
Above 960	500	3

#### 3.6.2 Measurement instruments

The measurement instruments are listed in chapter 2.5 of this report.

#### 3.6.3 Test setup

The test setup is as shown in chapter 2.4 of this report.

#### 3.6.4 Test procedure

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

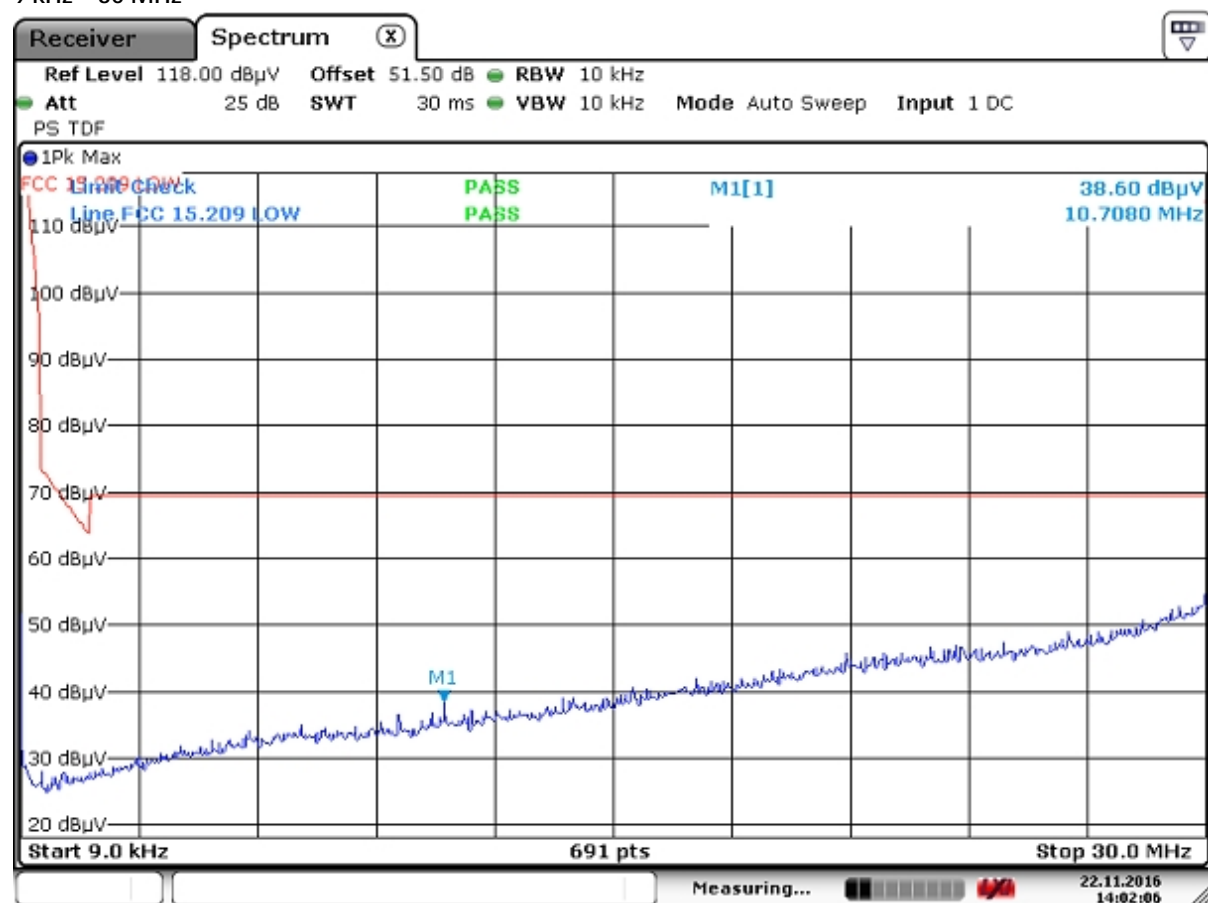
Other details are according to KDB Publication 558074 V02r05, sections 11.3 and 12.1

#### 3.6.5 Notes

- In the frequency range of 30 -100 MHz and 1 – 2.3 GHz the trace represents a combination of both antenna polarizations (worst case is shown).
- In the frequency range of 1 - 2.3 GHz and 1 – 18 GHz the green trace is measured using a peak detector and the red trace is measured using an average detector. The top limit line represent the peak limit and the bottom limit represents the average limit

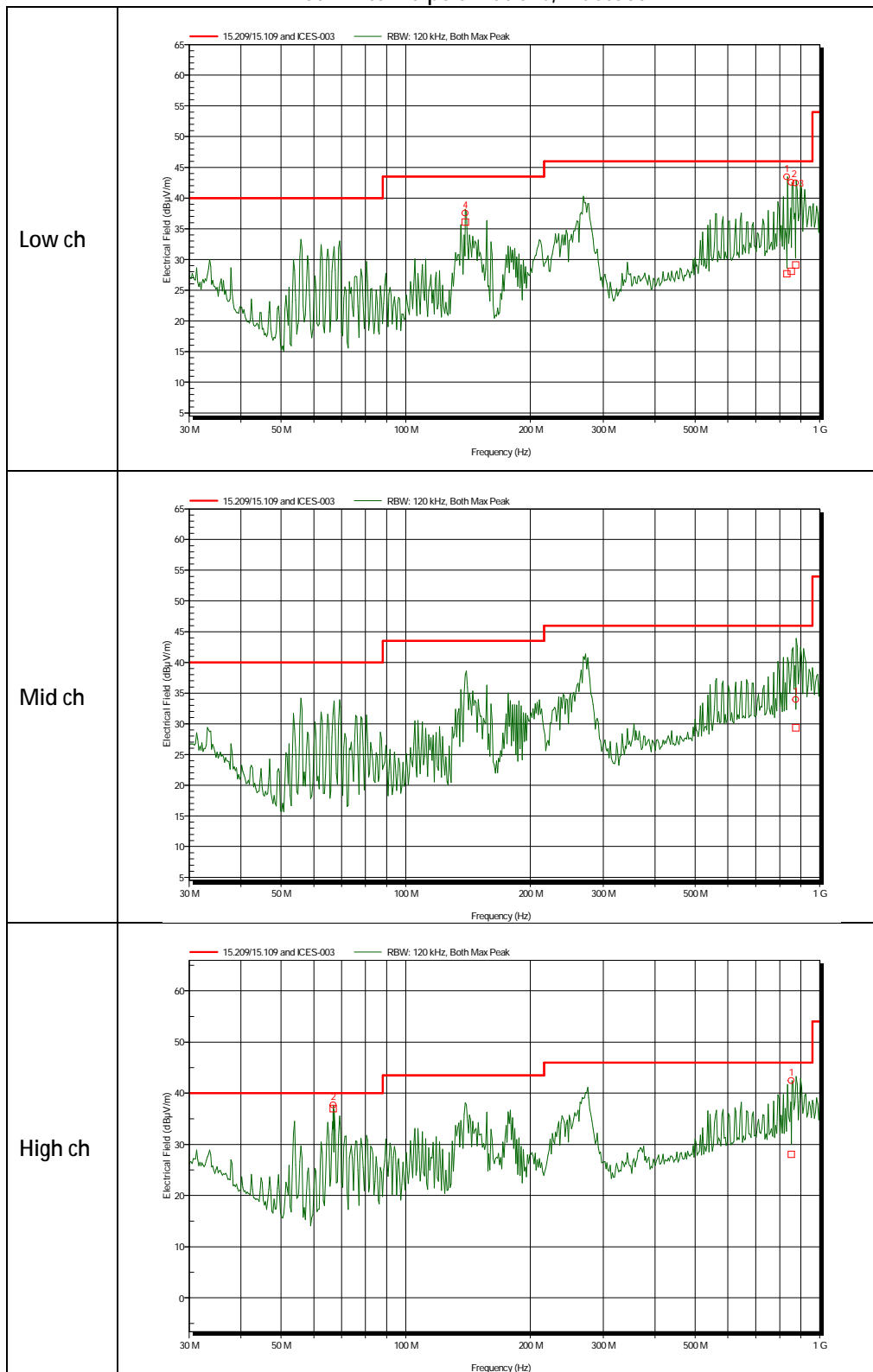
### 3.6.6 Plots of the Radiated Spurious Emissions Measurement

9 kHz – 30 MHz



30 – 1000 MHz

Both Antenna polarizations, Bluetooth BR



**Measured peaks 30 – 1000 MHz Low channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Quasi-Peak (dB $\mu$ V/m)	Quasi-Peak Limit (dB $\mu$ V/m)	Margin (dB)
833,1	Horizontal	1	27,7	46	-18,3
854,04	Horizontal	1	28,1	46	-17,9
874,74	Horizontal	1	29,1	46	-16,9
139,272	Horizontal	2,5	36,1	43,5	-7,4

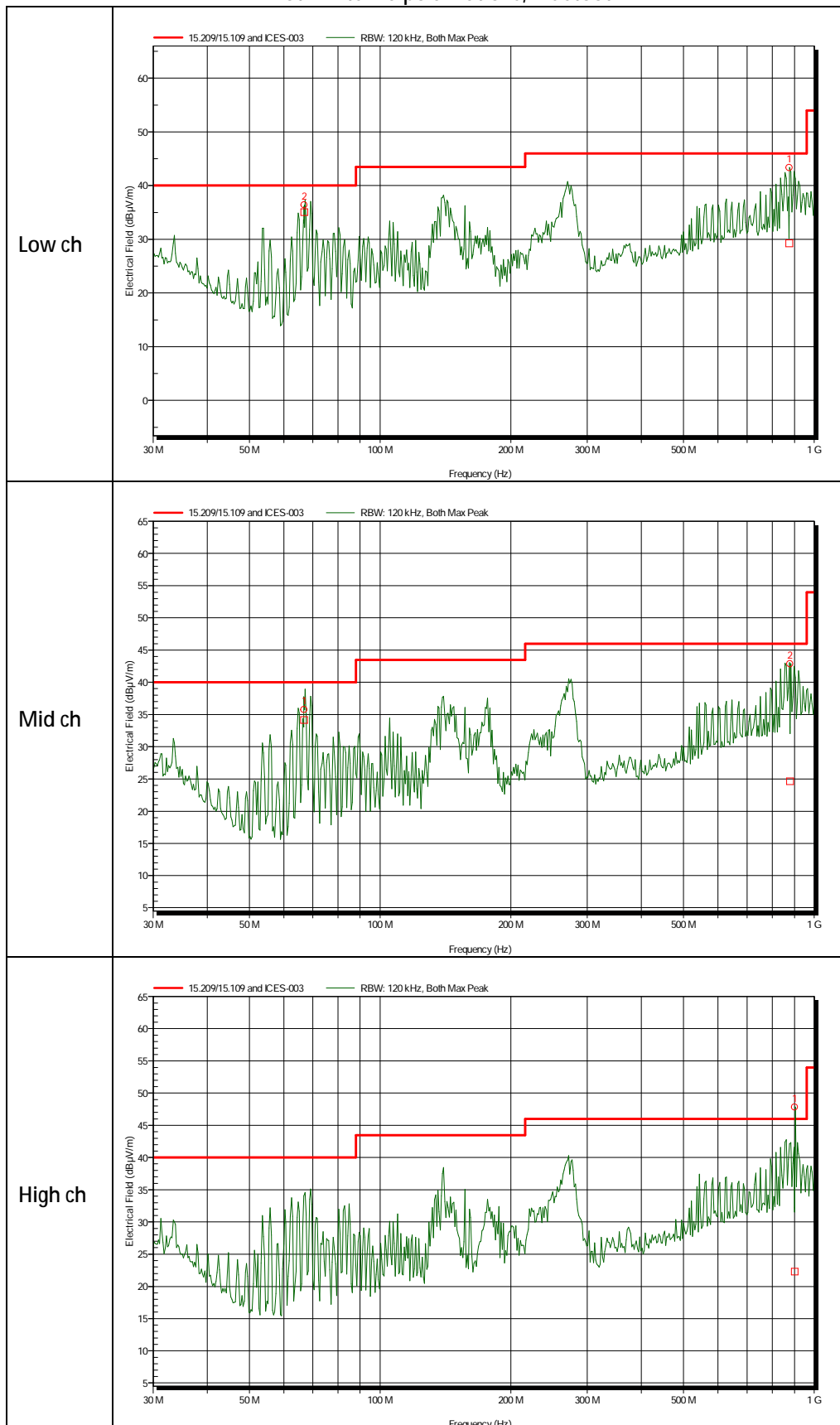
**Measured peaks 30 – 1000 MHz Middle channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Quasi-Peak (dB $\mu$ V/m)	Quasi-Peak Limit (dB $\mu$ V/m)	Margin (dB)
874,98	Horizontal	1	29,4	46	-16,6

**Measured peaks 30 – 1000 MHz High channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Quasi-Peak (dB $\mu$ V/m)	Quasi-Peak Limit (dB $\mu$ V/m)	Margin (dB)
854,04	Horizontal	1	28,1	46	-17,9
66,846	Vertical	2,5	37	40	-3,0

## Both Antenna polarizations, Bluetooth EDR



**Measured peaks 30 – 1000 MHz Low channel (EDR)**

Frequency (MHz)	Polarization	Height (m)	Quasi-Peak (dB $\mu$ V/m)	Quasi-Peak Limit (dB $\mu$ V/m)	Margin (dB)
874,98	Horizontal	1	29,3	46	-16,7
66,888	Vertical	2,5	35,1	40	-4,9

**Measured peaks 30 – 1000 MHz Middle channel (EDR)**

Frequency (MHz)	Polarization	Height (m)	Quasi-Peak (dB $\mu$ V/m)	Quasi-Peak Limit (dB $\mu$ V/m)	Margin (dB)
874,98	Horizontal	1	29,4	46	-16,6

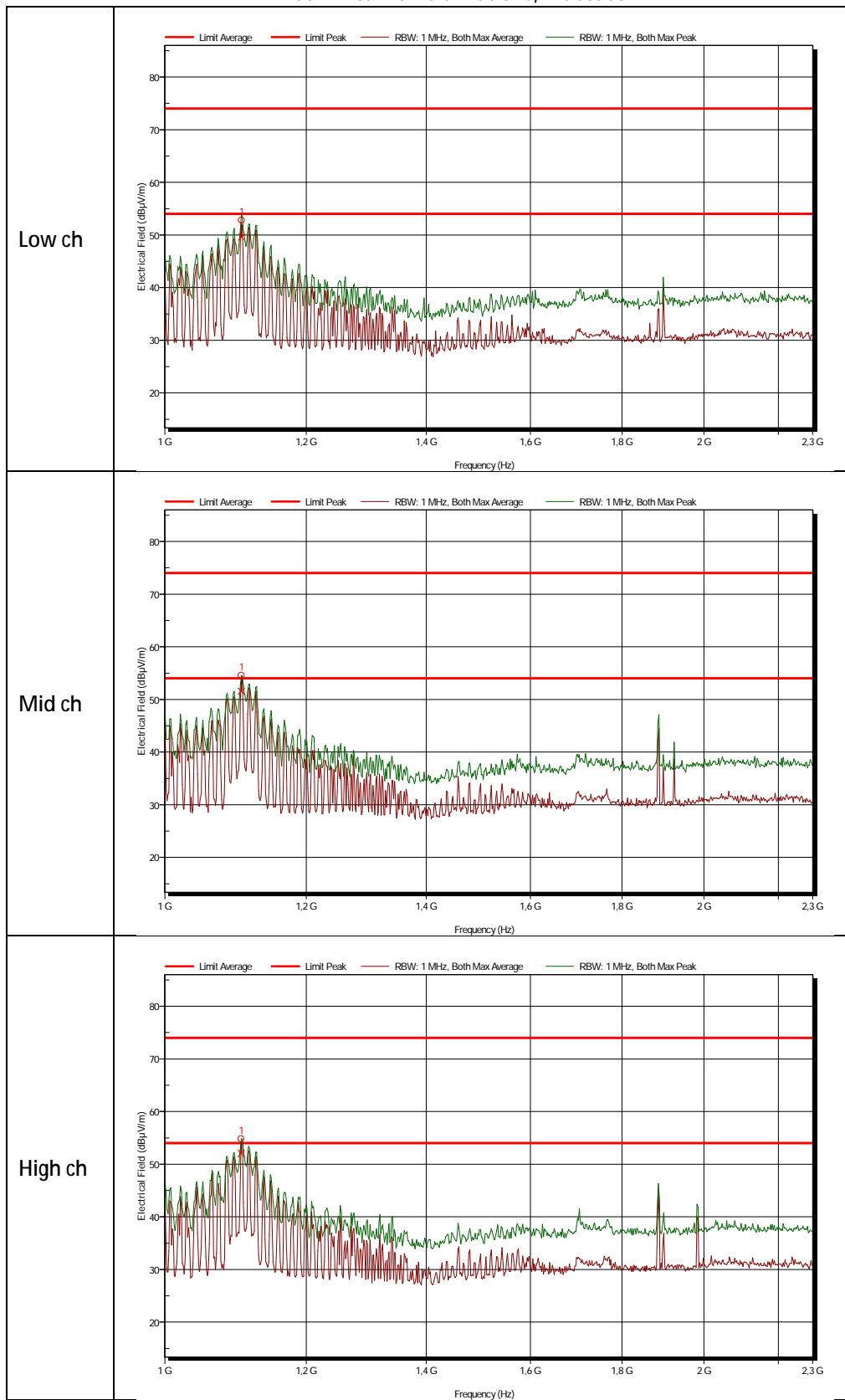
**Measured peaks 30 – 1000 MHz High channel (EDR)**

Frequency (MHz)	Polarization	Height (m)	Quasi-Peak (dB $\mu$ V/m)	Quasi-Peak Limit (dB $\mu$ V/m)	Margin (dB)
900,66	Vertical	3	22,3	46	-23,7



## 1 – 2.3 GHz

## Both Antenna Polarizations, Bluetooth BR



**Measured peaks 1 – 2.3 GHz Low channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
1,104	Horizontal	1,5	52,8	49,6	74	54	-21,2	-4,4

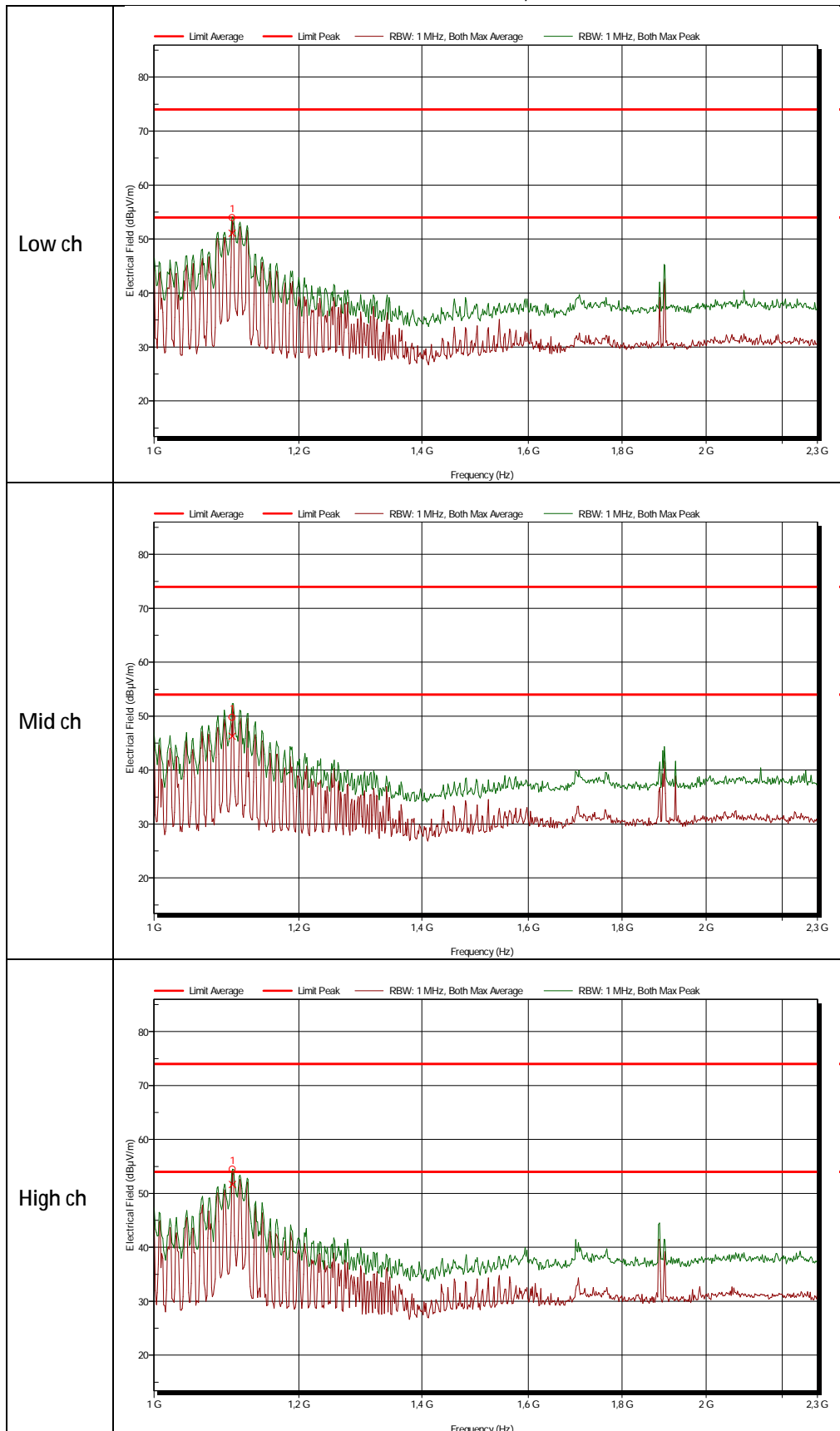
**Measured peaks 1 – 2.3 GHz Middle channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
1,104	Horizontal	1,5	54,6	51,6	74	54	-19,4	-2,4

**Measured peaks 1 – 2.3 GHz High channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
1,104	Horizontal	1,5	54,8	52,1	74	54	-19,2	-1,9

## Both Antenna Polarizations, Bluetooth EDR



**Measured peaks 1 – 2.3 GHz Low channel (EDR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
1,104	Horizontal	1,5	54	51,1	74	54	-20,0	-2,9

**Measured peaks 1 – 2.3 GHz Middle channel (EDR)**

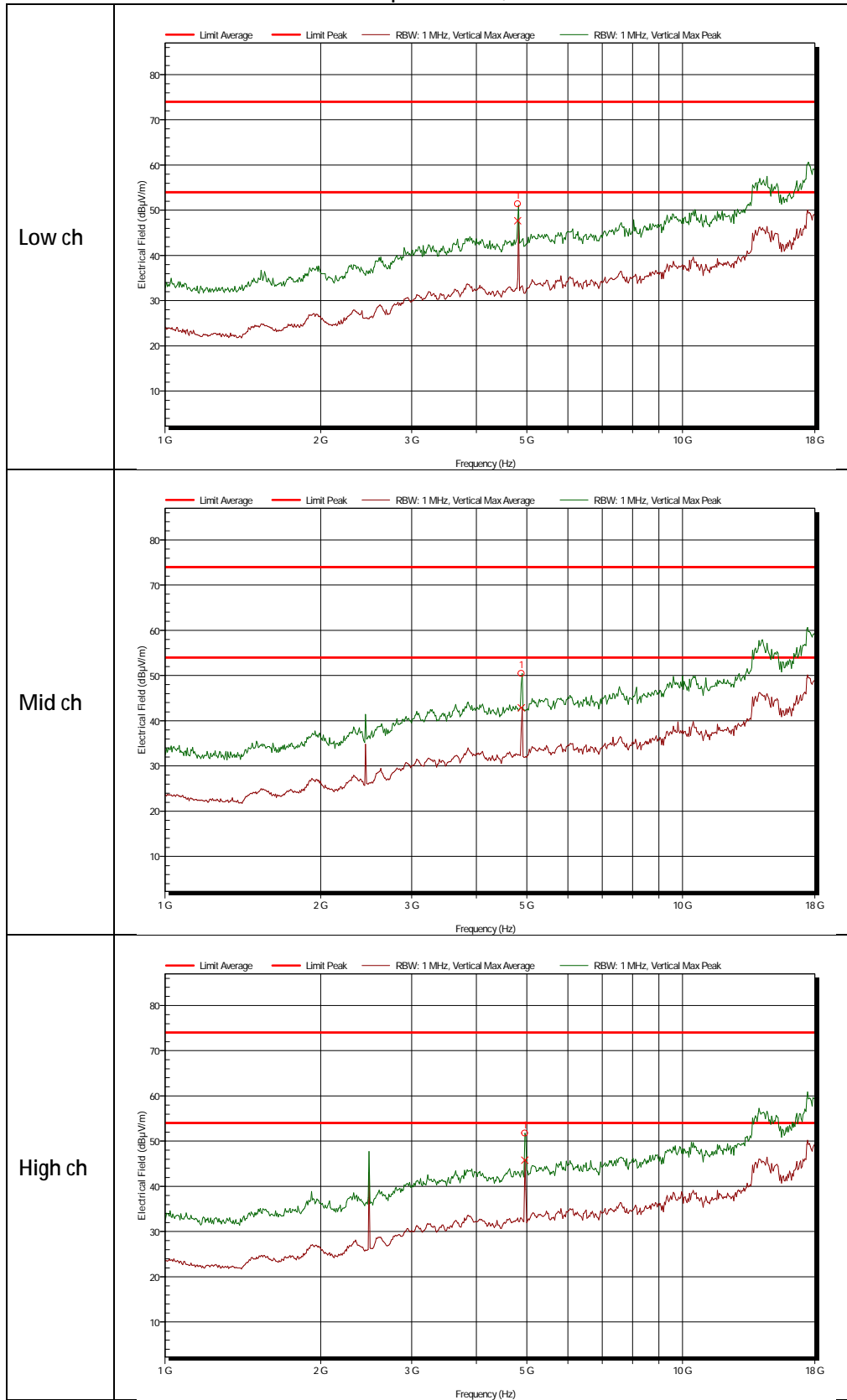
Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
1,104	Horizontal	3	49,7	46,3	74	54	-24,3	-7,7

**Measured peaks 1 – 2.3 GHz High channel (EDR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
1,104	Horizontal	1,5	54,5	51,6	74	54	-19,5	-2,4

1 – 18 GHz

## Vertical polarization, Bluetooth BR



**Measured peaks Vertical 1 – 18 GHz Low channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,804	Vertical	3,5	51,4	47,7	74	54	-22,6	-6,3

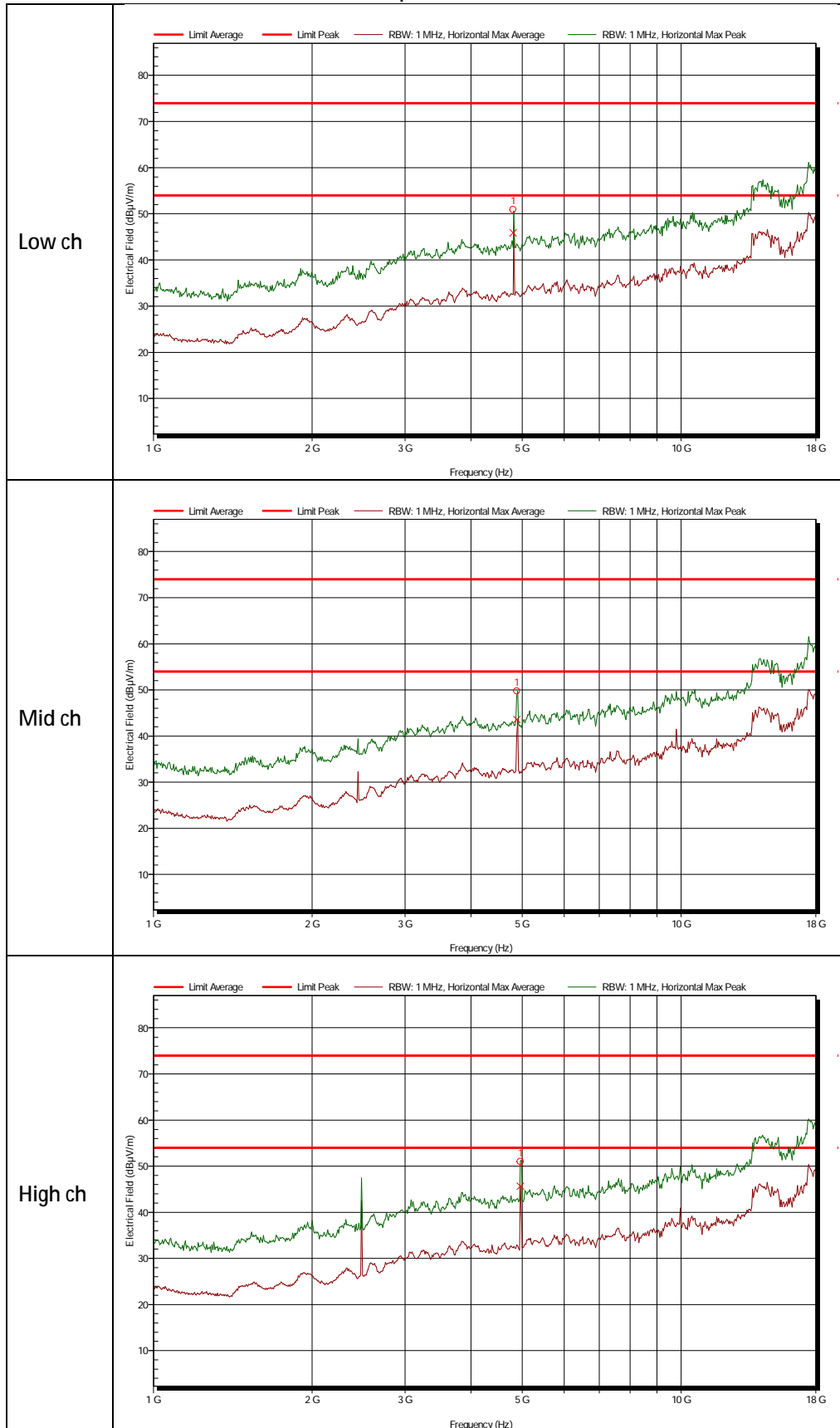
**Measured peaks Vertical 1 – 18 GHz Middle channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,882	Vertical	3	50,5	42,9	74	54	-23,5	-11,1

**Measured peaks Vertical 1 – 18 GHz High channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,959	Vertical	3	51,8	45,8	74	54	-22,2	-8,2

## Horizontal polarization, Bluetooth BR



**Measured peaks Horizontal 1 – 18 GHz Low channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,804	Horizontal	2,5	50,9	45,9	74	54	-23,1	-8,1

**Measured peaks Horizontal 1 – 18 GHz Middle channel (BR)**

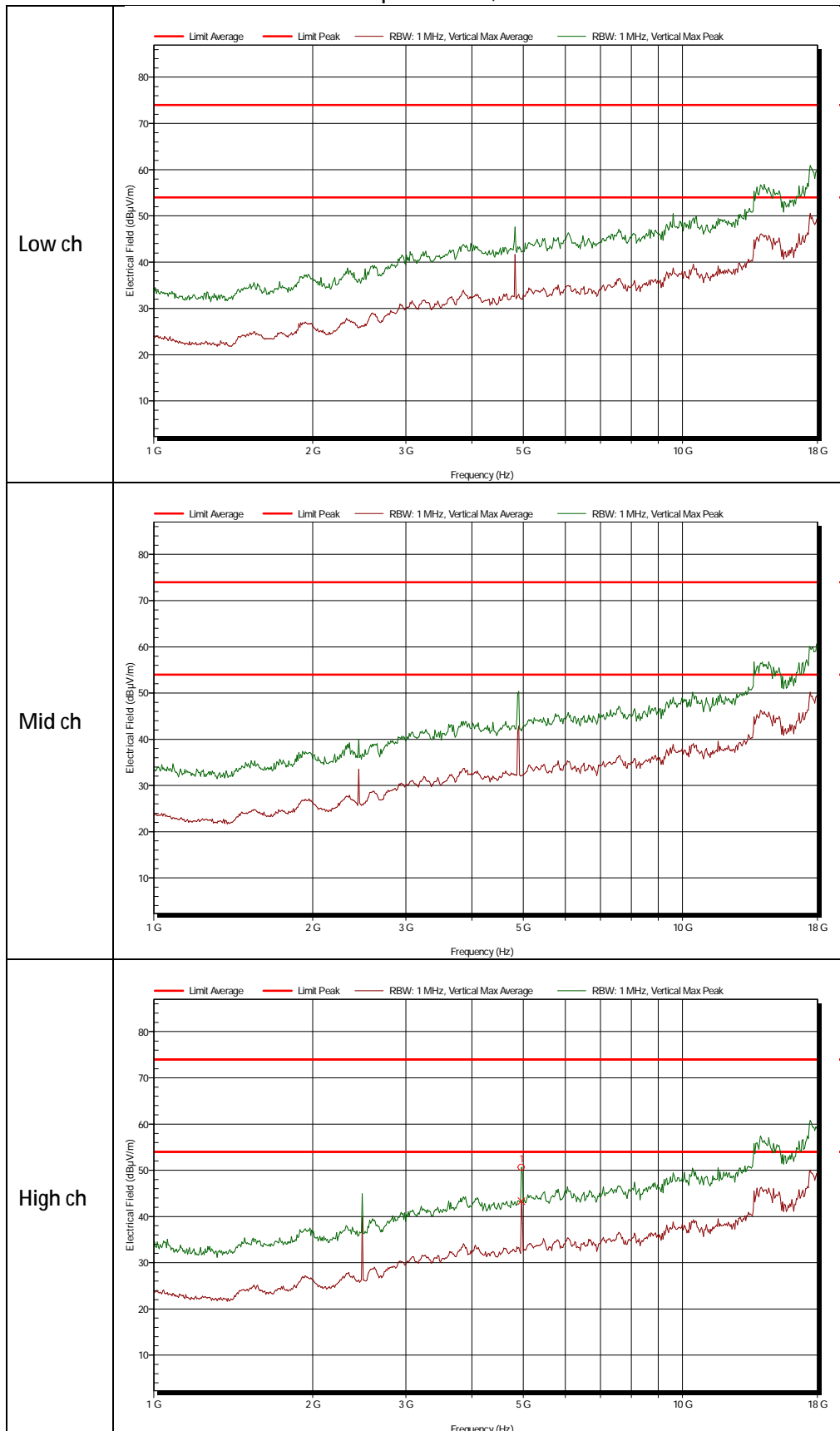
Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,882	Horizontal	3,5	49,7	43,6	74	54	-24,3	-10,4

**Measured peaks Horizontal 1 – 18 GHz High channel (BR)**

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,959	Horizontal	3	51	45,6	74	54	-23,0	-8,4



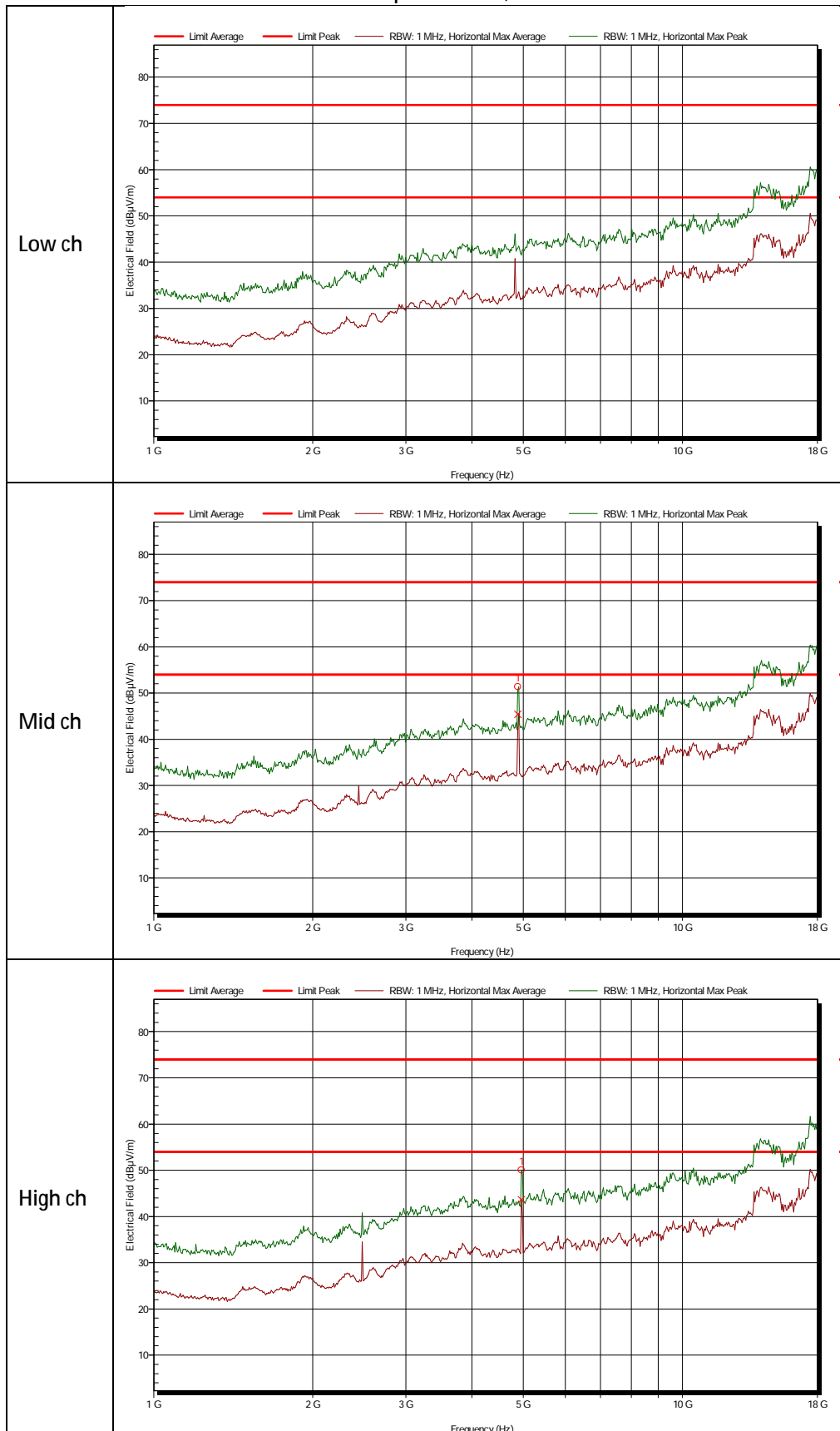
### Vertical polarization, Bluetooth EDR



## Measured peaks Vertical 1 – 18 GHz High channel (EDR)

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,959	Vertical	3,5	50,6	43,3	74	54	-23,4	-10,7

## Horizontal polarization, Bluetooth EDR



Measured peaks Horizontal 1 – 18 GHz Middle channel (EDR)

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,882	Horizontal	3,5	51,4	45,4	74	54	-22,6	-8,6

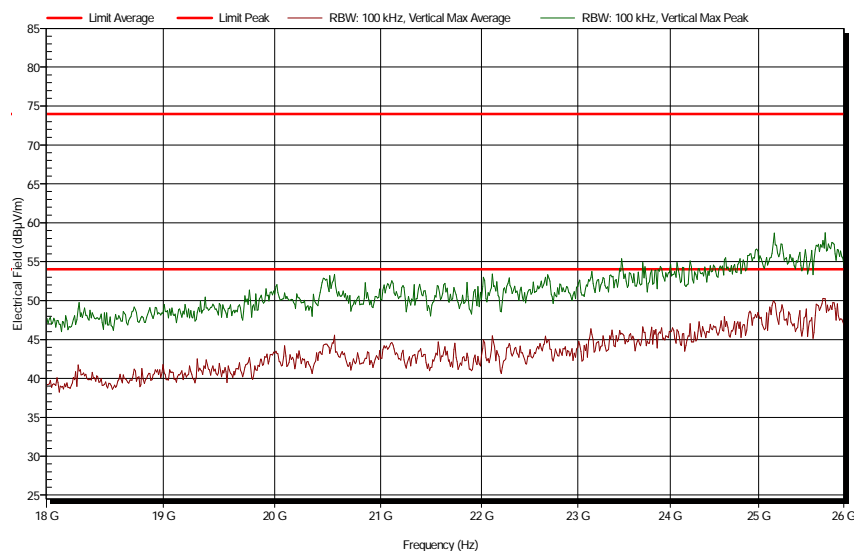
Measured peaks Horizontal 1 – 18 GHz High channel (EDR)

Frequency (MHz)	Polarization	Height (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Peak Margin (dB)	Average Margin (dB)
4,959	Horizontal	2,5	50	43,7	74	54	-24,0	-10,3

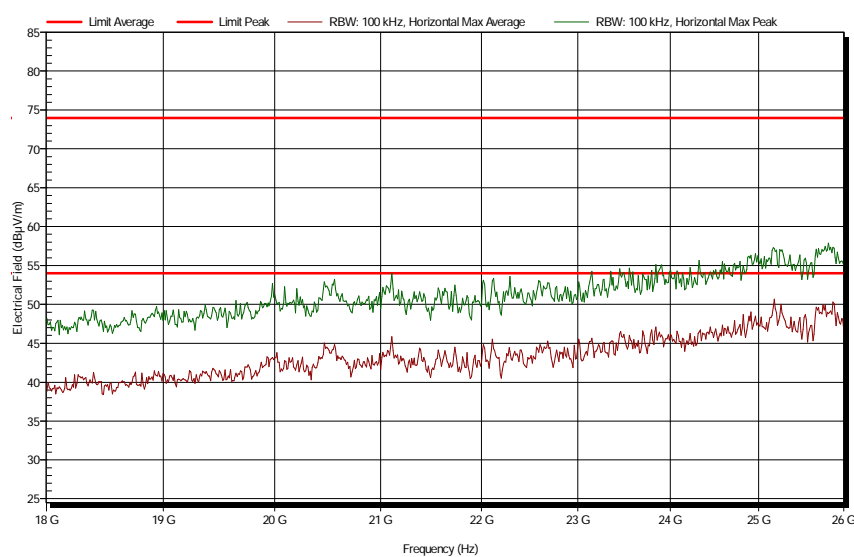
18 GHz to 26.5 GHz

A Radiated pre-scan was performed to see if any emission are found in the frequency range from 18 to 26.5 GHz.

### Vertical polarization, Bluetooth EDR, 3-DH5



### Horizontal polarization, Bluetooth EDR, 3-DH5



## 3.6.7 Measurement Uncertainty

### Measurement uncertainty Radiated emissions below 1 GHz

Horizontal polarization	
30 – 200 MHz	4.5 dB
200 – 1000 MHz	3.6 dB
Vertical polarization	
30 – 200 MHz	5.4 dB
200 – 1000 MHz	4.6 dB

### Measurement uncertainty Radiated emissions above 1 GHz

1000- 26000 MHz	+ 6.2/- 6.2dB
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